

Xylitol

WHAT IS XYLITOL?

- A low-potency, caloric sweetener
- A 5-carbon sugar alcohol
- Xylan, the polymer of xylose is an abundant polysaccharide found in the hemicellulose fraction found in the hemicellulose fraction of fibrous plants at around 20–35%, such as 20–35% in fibrous plant foods such as corn cobs, rice straw, sugarcane bagasse, soyhull and hardwood trees
- Xylitol can be found in several fruits and vegetables at low levels—including berries, mushrooms, corn cobs and oats



PROPERTIES OF XYLITOL

- Low in calories: Contributes 2.4 kcal/g
- Low potency sweetener – approximately equivalent to sucrose in sweetness but is the sweetest of all polyols
- Also functions as an emulsifier, humectant, stabiliser and thickener
- Non-cariogenic
 - Advantageous in reducing dental cavities, preventing tooth demineralisation on regular use
 - Exhibits reductions in cavities and enhanced remineralisation as compared to sorbitol, another sugar alcohol
- Xylitol is slowly absorbed from the digestive tract largely due to the lack of a specific transport system across the digestive mucosa
- After ingestion, only 25–50% of xylitol is absorbed in the small intestine
- Upon entering the hepatic metabolic system, xylitol is readily sequestered in the liver, where it is further metabolised via the glucuronic acid-pentose phosphate shunt of the pentose phosphate pathway
- Prebiotic effect: 50–75% of ingested xylitol is not absorbed in the small intestine; it moves to the gut and serves as a substrate for growth of intestinal flora, yielding short-chain fatty acids and small amounts of gas (hydrogen, methane and carbon dioxide)



APPLICATIONS

- Chewing gums
- Hard coating (of chewing gums pellets)
 - One of the major commercial applications of xylitol
- Baked goods
 - Effective humectant in cakes and muffins – binds moisture, improves product texture and shelf life
- Beverages
- Chocolate
- Confectionery
- Pharmaceuticals
- Table top sweetener
- Dairy products and frozen desserts
 - Xylitol will increase the freezing point depression factor (FPDF) and result in a softer, more 'scoopable' finished product





FLAVOUR PROFILE

- Has a cooling effect
- High levels of xylitol in no-sugar-added chocolate has been attributed to a slightly 'scratchy' aftertaste



REGULATORY STATUS OF XYLITOL

- Established ADI for Xylitol: **not specified** (1983)
 - No health risk was found in human studies
- Xylitol has been approved for use in foods across countries but are subject to varying specifications
- The US Food and Drug Administration (US FDA) approved xylitol for use in food applications as a food additive and for use in foods for special dietary purposes
- The health claim "Does not promote tooth decay" for xylitol in food products was later approved in 2006
- Codex General Standard for Food Additives (GSFA) approved xylitol for use in food in general in 1981
- Food Standards Australia and New Zealand (FSANZ) approved xylitol for use in foods, mandating an advisory statement to the effect that the excess consumption of xylitol may result in a laxative effect in products that contain over 10% of xylitol
- The European Food Safety Authority (EFSA) approved xylitol as a food additive in 2008, later permitting the following health claim in 2011: "Consumption of foods/drinks containing xylitol contributes to maintenance of tooth mineralisation."
- For use in the EU, food products containing over 10% of xylitol must carry an advisory statement on packages, as xylitol consumed in excess can have a laxative effect



XYLITOL IN A NUTSHELL

Scientific Name

Xylitol

Brand Name

Xlismart, Smart Sweet Xylitol, Xylosweet

Sweetness Intensity

Approximately equivalent to sugar

ADI Limit

Unspecified

Safe for Children?

Yes

Safe for Pregnant and Breastfeeding Women?

Yes

Nutritive Value

2.4 kcal/g



References

- ¹ Mérillon, J. and Ramawat, K. (2018). Sweeteners. Cham, Switzerland: Springer Nature.
- ² O'Donnell, K. and Kearsley, M. (2008). Sweeteners and Sugar Alternatives in Food Technology. 2nd ed. New York, NY: John Wiley & Sons.
- ³ European Association of Polyol Producers. (2018). Legislation – Food.
- ⁴ WHO. (2018). Evaluations of JECFA – Xylitol.